

Scientifically-Interesting Story of COVID-19 and the Earth System: Lesson Resources



Are you looking for resources to help students explore the connection of the COVID-19 pandemic to the Earth System? Consider using the Scientifically Interesting Story resources in your classroom today!

This Scientifically Interesting Story includes the following set of "tools" that teachers may use to address the science practice of *Data Analysis and Interpretation* all within the context of understanding the interactions of COVID-19 with the Earth System. These resources are flexible and adaptable and may be used in a variety of ways depending upon your classroom and instructional needs.

Resource Description and Intended Uses

Tool	Purpose	Description
COVID-19 & the Earth System:	This teacher-centered	Teacher Presentation

Teacher Presentation & Interactive Google Files

presentation weaves in various resources found in the My NASA Data Scientifically-Interesting Story, COVID-19 and the Earth System, and models how this data story can be unpacked for your students. This resource, and its instructional technology components, can be adapted to fit your teaching style, standards and needs of your students. These resources are offered to help you scaffold data analysis and interpretation, increase engagement, and leverage the power of NASA data for authentic learning!

The presentation is divided into three parts: 1. Exploring Patterns of Human Geography and COVID-19, 2. COVID-19 and Nitrogen Dioxide: Exploring Stability and Change in the Earth System, 3. Student Research Opportunity: Exploring these Data in My Community.

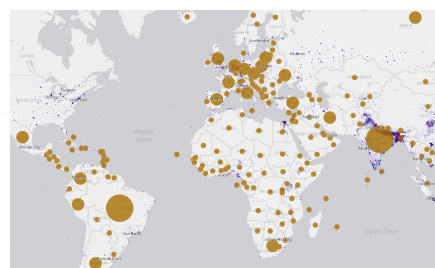
It features various interactive elements ranging from the integration of Google products with GIS interactive models and the Earth System Data Explorer visualization tool.



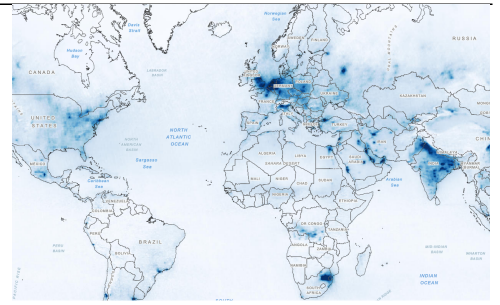
Interactive Models

The two interactive models leverage the power of Geographic Information Systems (GIS) to visualize NASA and other related data to facilitate data analysis and interpretation. These internet-based models are designed to be used by students and/or teachers on a one-to-one device or one-to-many setting.

[Exploring Patterns of Human Geography and COVID-19](#)



[COVID-19 and Nitrogen Dioxide: Exploring Stability and Change in the Earth System](#)



Videos

Follow along with Subject Matter Expert, Dr. Brad Hegyi, as he models for teachers and students data analysis. The videos are perfect for students, as well as for teachers who are learning strategies to connect COVID-19 with Earth System Science standards. Dr. Brad walks learners through a variety of human-dimension data (such as population density, COVID-19 spreading rates, and more), as well as global nitrogen dioxide concentrations.

[Video 1: Preparing for The Dig](#)

[Video 2: Understand the Data](#) that describes COVID-19

[Video 3: Ask Scientific Questions](#)

[Video 4: Answer the Questions](#) with Evidence

[Video 5: Create and Update a](#) Data Picture

Earth System Data Explorer

The **Earth System Data Explorer** may be used by teachers and students to analyze patterns of COVID-19 and nitrogen dioxide in an area of interest. Teachers may use this tool to include regionally-relevant examples in their instruction. Students may use the resource to explore an area of interest for research or problem-based learning projects.

[Earth System Data Explorer](#)

Access the relationship of COVID-19 and nitrogen dioxide analyzing the following datasets:

- Daily Air Column Concentration of NO₂
- Monthly Air Column Concentration of NO₂
- Monthly Anomaly of NO₂ Air Column Concentration
- COVID-19 Confirmed Case
- COVID-19 Incidence Data

Grade Band

- [6-8](#)
- [9-12](#)

Supported NGSS Performance Expectations

- [MS-ESS3-3: Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment.](#)
- [MS-ESS3-4: Construct an argument supported by evidence for how increases in human population and per-capita consumption of natural resources impact Earth's systems.](#)
- [MS-LS1-5: Construct a scientific explanation based on evidence for how environmental and genetic factors influence the growth of organisms.](#)
- [MS-LS2-1: Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem.](#)
- [MS-LS2-4: Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations.](#)
- [HS-ESS3-3: Create a computational simulation to illustrate the relationships among the management of natural resources, the sustainability of human populations, and biodiversity.](#)
- [HS-ESS3-4: Evaluate or refine a technological solution that reduces impacts of human activities on natural systems.](#)
- [HS-ESS3-6: Use a computational representation to illustrate the relationships among Earth systems and how those relationships are being modified due to human activity.](#)

NGSS Disciplinary Core Ideas

- [LS1B: Growth and Development of Organisms](#)
- [LS1C: Organization for Matter and Energy Flow in Organisms](#)
- [LS2C: Ecosystems Dynamics, Functioning and Resilience](#)
- [ESS3A: Natural Resources](#)
- [ESS3B: Natural Hazards](#)
- [ESS3C: Human Impacts on Earth Systems](#)

NGSS Science and Engineering Practices

- [Asking Questions and Defining Problems](#)
- [Developing and Using Models](#)
- [Analyzing and Interpreting Data](#)
- [Using Mathematics and Computational Thinking](#)
- [Engaging in Argument from Evidence](#)
- [Obtaining, Evaluating and Communicating Information](#)

Crosscutting Concepts

- [Patterns](#)
- [Cause and Effect](#)
- [Scale, Proportion, and Quantity](#)
- [Systems and System Models](#)
- [Stability and Change](#)

Related Links

- [Q&A: Scientists Analyze How the Pandemic Affected Air Quality](#)
- [Video: Using Models to Evaluate COVID-19 Effects on Air Pollutants](#)
- [Video: Using Satellites to Track Changes in Air Quality during the COVID-19 Pan...](#)
- [Video: Using Models to Track Air Pollution](#)
- [Satellite Observed Tropospheric NO₂ Concentration Decreased over East Asia in e...](#)
- [Video: Human Fingerprint on Global Air Quality](#)